CTE Program Narrative

NAME OF COLLEGE: Cerro Coso Community College

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DATE: January 13, 2016

DIVISION: CTE

FACULTY: Valerie Karnes

PROGRAM NAME: Information Technology Plus Certificate

REASON FOR APPROVAL REQUEST (Check One):

- ☐ New Program Proposal
- ☐ Program Revision Proposal (Substantial or TOP Code Changes)
- ☐ Locally Approved

TYPE OF DEGREE:

- ☐ Certificate of Achievement
- ☐ Associate of Arts
- ☐ Associate of Science
- ☐ Associate of Arts for Transfer
- ☐ Associate of Science for Transfer
- ☐ Other

TRANSFER APPLICABILITY: Yes ☐ No ☐

ATTACHMENTS/INFORMATION REQUIRED:

Labor/Job Market Data and Analysis
Advisory Committee Meeting Minutes
List of Advisory Committee Members
Employer Survey, if applicable

1. Statement of Program Goals and Objectives

Identify the goals and objectives of the program. For CTE programs, the statement must include the main competencies students will have achieved that are required for a specific occupation. The statement must, at a minimum, clearly indicate the specific occupations or fields the program will prepare students to enter and the basic occupational competencies students will acquire.

If the program is selective, describe relevant entry criteria and the selection process for admission to the program. Specify all mandatory fees that students will incur for the program aside from the ordinary course enrollment fee.

Statement of Program Goals and Objectives

The goals of this new certificate are to fill a documented need in the area of information technology, cyber security and information assurance of our service area employers. The certificate is designed for students pursuing professional employment in computer information systems for business. This certificate program provides students with skills to enter the job market as help desk providers, computer support specialists, computer repair technicians, networking technicians, information assurance technicians, and cyber security technicians. Designed for both full and part-time students, this program is appropriate to both those currently employed and those seeking to enter this field. The courses are aligned with industry certificates and students are prepared to take the A+ exam, Net+ exam and Security+ exam.

Program Learning Outcomes:

1. Interpret and use technical information in communications, to solve common business programs using Information Technology systems and applications.

2. Demonstrate the ability to support strategies in client computing and user support, including the ability to configure, install, diagnose, and support hardware and software issues.

3. Design, analyze, and support computer networks.

4. Implement and evaluate network security solutions, related to servers, storage and virtualization.

2. Catalog Description

Enter exactly as it will appear in the catalog, including program outcomes. The description must also

- *Convey the certificate's goals(s) and objectives*
- *Provide an overview of the knowledge and skills that students who complete the requirements must demonstrate (student learning outcomes)*
- *List all prerequisite skills or enrollment limitations*
- *Mention any risks, such as occupations that are inherently competitive or low-salaried and/or occupational areas where inexperienced graduates are not generally hired.*
- *For CTE programs, the description must list the potential careers students may enter upon completion.*
- *Convey what the student may expect as an outcome*

If applicable, reference accrediting and/or licensing standards. If there is a widely recognized certification provided by a professional association, specify whether the program will fully prepare completers for the recognized professional certification.

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Students exiting this program are prepared to enter the fields of information technology, information assurance or cyber security. Students can demonstrate the following student learning outcomes.

1. Interpret and use technical information in communications, to solve common business programs using Information Technology systems and applications.
2. Demonstrate the ability to support strategies in client computing and user support, including the ability to configure, install, diagnose, and support hardware and software issues.
3. Design, analyze, and support computer networks.
3. Implement and evaluate network security solutions, related to servers, storage and virtualization.

Students entering this program develop all the skills necessary to be successful are taught in the first course in the career pathway (CSCI C101). Jobs in information technology and cyber security are in high demand and pay from $77,000-$86,000 (per Labor Market data attached).

3. Program Requirements

- ✓ *The program requirements must be consistent with the catalog description. The number of units, specific course requirements and the sequence of the courses must be coherent, complete and appropriate. Display the program requirements in a table format that includes all courses required for completion of the program (core requirements and required or restricted electives), subtotal of core units, and total program units. For each course, indicate the course department number, course title, and unit value.*

Display of Program Requirements

Core Courses	**Title**	**Units**
CSCI C101	Introduction to Computer Information Systems	**3**
CSCI C142	Information & Communication Technology Essentials	**4**
CSCI C143	Computer Network Fundamentals	3
CSCI C146	Security+ Fundamentals of Networks	**3**
	Total Core Courses	**13**

In addition to the core courses, the student must take at least 0 units from the following courses:

Elective Courses	Title	Units
	Total Elective Courses	

Total Units Required for Certificate	

Display of Proposed Sequence

First Semester	Units
CSCI C101	3
CSCI C142	4
Total	**7**

Second Semester	Units
CSCI C143	3
CSCI C146	3
Total	**6**

Third Semester	Units
Total	

Fourth Semester	Units
Total	

7. **Master Planning** (Background and Rationale)

Given the stated goals and objectives, address the role the proposed program will fulfill in the college's mission and curriculum offerings. This discussion may include some history of the program proposal origins, a description of the program purpose, and/or the program's relevancy for the region and college.

The proposal must demonstrate a need for the program that meets the stated goals and objectives in the region the college proposes to serve with the certificate. A proposed new certificate must not cause undue competition with an existing program at another college.

If any expenditures for facilities, equipment or library and learning resources are planned, please explain the specific needs in this section.

If the program is to be offered in close cooperation with one or more specific employers, a discussion of the relationship must be provided.

There has been an increasing need in our service area, state and across the country for qualified entry-level personnel to enter the Cyber Security, Information Assurance and general Information Technology/Networking Technology fields. This need continues to expand as the networks and hackers and hostile groups infiltrate systems in major organizations. The Information Technology Plus Certificate of Achievement will provide students with a baseline of courses to be immediately employed in Cyber Security, Information Assurance, Computer Repair, Computer Networking, and Computer Operator. The employer community within our service area supports the need for this certificate and has requested over one hundred graduates per year.

Most on-site courses at the IWV campus are taught in the Learning Resource Center. There are two computer lab classrooms. One classroom is equipped with 30 student stations and the third is equipped with 29 student stations. All rooms have an instructor station, an overhead projector, and whiteboards. Although iTV rooms are available to allow multiple campuses to participate in a single course, the rooms are not equipped with computer stations, limiting their usefulness for CSCI courses that require hands-on access to technology to achieve the student learning objectives. Increasingly, other disciplines (English, math, engineering, science) are requesting to use the computer classrooms for their own courses. It is expected as the college continues to develop science, technology, engineering, and as the use of computer technology is infused across the curriculum, the demand for these rooms will increase and additional facilities will be required. In addition, if the college pursues a partnership with Cisco to further develop a Information Technology/Cyber Security/Information Assurance program, it will be required to have a dedicated laboratory to be designated as a Cisco certified college.

The college has used VTEA funds to further develop the CIS program in the past. If it determined that the college needs to be a Cisco certified partner, there will be space required, equipment required and an ongoing equipment cost that could be funded through federal grants for Cyber Security.

The Library and LRC are used to support the current Computer Information Systems program. The library is used to support research for the courses in the program. Changes to the program will not require additional support. The department faculty regularly works with the librarian to acquire books and materials for the area and programs. Additionally, several courses in the department are directly supported with Library research instructions tailored to the course by the library staff.

The program was developed and is supported by the Computer Information Systems Advisory Committee. A new internship program with Jacobs Technology and the Naval Air Warfare Center at China Lake demonstrates the strong commitment of industry to this program. Employers are interviewing and hiring student interns that have completed the first course in the sequence (CSCI C101) with the expectation that the students will complete the IT Pus Certificate and the CIS program within three years. This is a direct result of a close relationship with employer needs. The five employers on the Advisory Committee are also considering adopting the Jacobs model of internships.

7. Need for Program

a. Enrollment and Completer Projections

Address and justify the number of projected students or "annual completers" to be awarded the certificate each year after the program is fully established.

Enrollment has been declining over the past few years (2011-2014) after the program was redesigned. The program lacked clarity in both the sequencing of courses and the seemingly random pathway. Students took a core group of courses and then selected options from a list which were diverse. Completers within the ranged from 8 to 10 each year.

The modified Computer Information Systems certificate and degree have been aligned with the state model and the pathway is clear. Students will have a defined sequence of courses with defined job title(s) to target their careers. Employers have come to the college requesting students in this new sequence to intern or be apprentices while they are going through the program. New pathways for CIS majors including help desk technicians, computer repair technicians, network technicians, information assurance technicians, cyber security technicians, and computer security technicians have broaden the interests of students. As the new careers are marketed to students and high levels of job placements begin to occur, we expect an increase in enrollment in the CIS program. Employers will be emphasizing certificate and degree completion as a requirement to maintain employment as well as key to promotions on the job, which will assist in the completion of our program. We expect to complete 25-30 students per year and expand to 50-65 students in the next few years.

For those students interested in transfer, the new model curriculum will assist students that wish to transfer to an institution offering baccalaureate degrees in computer information systems or management information systems, as well as students who desire to enter the workforce upon graduation from the college. All of the courses offered in the CIS degree are accepted for transfer within the UC and CSU systems (source: assist.org) as well as other universities throughout the US.

b. Labor Market Information (LMI)

Summarize the Labor Market Information (LMI) and employment outlook (Including citation for the source of the data) for students exiting the program.

Enter table or chart as a separate attachment.

The attached Labor Market report for Information Technology/Computer Information Systems shows a regional need for 95 jobs with the 2020 projections to be 100 jobs. This represents a 5.3% increase in jobs. While this shows demonstrated need, in the Cerro Coso service area there are many known jobs that are not documented because employer's corporate offices are out of state. For example, positions appropriate for IT/CIS graduates such as those required by aerospace contractors, the Naval Air Warfare Center at China Lake, and even our own Cerro Coso Community College classified IT staff are not captured in this reporting system because the corporate offices are located outside our service area.

Employers in the Indian Wells Valley have attended the Advisory Committee meetings over the past several years and have actively engaged in the discussions and development of the new certificate(s) and degree. While the numbers of job opportunities are reflective in the environmental scans attached, two local employers are not captured (Jacobs Technology and the Naval Air Warfare Center at China Lake). These two specific employers have come to the college in the past few months presenting their local hiring requirements. Each employer is estimating a minimum of 40-50 students needed for their organization. Additional employers are making appointments and requesting to attend the upcoming Advisory Committee to present their needs. The environmental scan is not reflective of the actual need. This field is expected to expand.

c. Employer Survey (if applicable)

When strong LMI data is not available, an employer survey may be submitted. Provide a copy of the survey, including the number of those surveyed, number of responses, and a summary of the results. The survey must address the extent to which the proposed degree or certificate will be valued by employers.

7. Place of Program in Curriculum/Similar Programs

Review the college's existing program inventory, then address the following questions:

- *Do any active inventory records need to be made inactive or changed in connection with the approval or the proposed program? If yes, please specify.*
- *Does the program replace any existing program(s) on the college's inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s).*
- *What related programs are offered by the college?*

These courses also serve the Computer Information Systems Associate's degree. The Information Technology certificate is the first level of the Computer Information Systems pathway and provides students a first step into the industry. The second level certificate (CIS certificate) has several additional courses that result in another certificate and finally adding General Educational requirements; students will earn an Associate Degree of Science. This certificate will also be a first level to other future programs including a Cyber Security program.

There are no other colleges in our service area and the program does not represent unnecessary duplication. The program does not represent unnecessary duplication of training programs and other regional colleges offering a similar program are too far away to impact employer's needs in our service area.

7. Similar Programs at Other Colleges in Service Area

List similar programs offered at other colleges within the Central/Mother Lode Region that may be adversely impacted. Enter 'none' if there are no similar programs.

College	Program
None	

Supporting documentation required

Labor Market Information

In a separate attachment, provide current Labor Market Information showing that jobs are available for program completers within the local service area. Statewide or national LMI may be included as supplementary support but evidence of need in the specific college service area or region is also necessary.

List of Members of Advisory Committee

This list must include advisory committee member names, job titles, and affiliations.

Name	**Title**	**Affiliation**
Melissa Oliverez	Manager	Continental Labor
Johnson Daniel	Network Administrator	Coso/Teragen contrastIT
Mary Lorber	Software Architect/Program Mgr	Engility
Nestor Cora	IT Business Owner	Intrepid IT Solutions, LLC
Sean Callihan	STARS IT/IA Director	Jacobs Engineering
Rich Christenson	Recruiter	Jacobs Engineering
Vaughn Corbridge	VX-9 TIMS PM/Analyst	HTii
Eileen Shibley	CEO	Monarch
Katherine Hu	Scientist	Searles Valley Mineral
Margaret Porter	Information Assurance	NAWC China Lake
Autumn Piotrowski	Information Assurance	NAWC China Lake
Mark Henderson	Directed Energy Manager	NAWC China Lake
Linda Homer	Software Programmer	NAWC China Lake
John Paul	Program Manager	New Directions Technology, Inc
Kishor Joshi	CEO	Pertexa

Recommendation of Advisory Committee (Meeting Minutes)

In a separate attachment, provide minutes of the advisory committee meetings at which the program was discussed and approved, with relevant areas highlighted, as well as a summary of the advisory committee recommendations.

CIS Advisory Committee Meeting

Meeting Date April 9, 2014

Attendees:

- Valerie Karnes: Dean CTE IWV
- April Browne: CIS/CS faculty IWV
- John Bradley: Operations Lead, Navair

Model Curriculum

April went through the courses in the Draft Model Curriculum. It was discussed that this is a Model Curriculum and not a Transfer Curriculum because there are not enough 4 year degrees offered by the CSU's in the CIS area.

Core Classes

1. Information & Communication Technology Essentials C-ID ITIS 110 is equivalent to our current CIS 140 and CIS 141 A+ certification courses.
2. Computer Information Systems C-ID ITIS 120 is equivalent to our current CIS 101 Introduction to Computer Information Systems course. This course has been revised to the C-ID standard already for the Business Transfer degree
3. Introduction to Programming Concepts and Methodologies C-ID ITIS 130 is equivalent to our current CIS 251 Introduction to Visual Basic course
4. Computer Network Fundamentals C-ID ITIS 150 is equivalent to our current CIS 143 Network + course.

Elective Courses (2 courses or 6 units)

1. Introduction to Systems Analysis and Design C-ID ITIS 140 based on conversations with the other CIS instructor Matt Hightower, it was decided that we would not offer this course as an elective. It has been offered in the past and most of the information is covered in the Database course.
2. Introduction to Information Systems Security C-ID ITIS 160 is equivalent to our current CIS 146 Security+ course
3. Introduction to Database Management Systems C-ID ITIS 180 is equivalent to our current CIS 240 Database course
4. Business Communication C-ID BUS 115 is already offered for the Business Transfer degree
5. Systems and Network Administration C-ID ITIS 155 is a course we do not currently offer. This course prepares students for the CompTIA Server+ certification (similar to all of our other certification courses). This leads to our second agenda item a discussion on Operating System certifications. This course may fulfill it based on the proposed textbooks but it isn't entirely clear if it would or not. John Bradley said he received a list of approved courses for that area and would forward this me (received 4/9/2014 and is attached).

This course would be good for students to have because it would move their resumes forward in the process if they are looking for a Systems Administrator (SA) or Computer Security job. It was decided that we should offer this course as an elective in the program even if it won't fulfill the Operating System requirement. This would be a good CEU course for current SA and security personnel.

Math Classes

The math class options were brought up. All of the math courses are already offered at the college. Students must have 1 math class from Statistics which if often the suggestion for transferring. We don't currently have Calculus 1 in the degree and would have to add that as an option for this degree.

Operating System Certification

John said there is still some confusion if applicants MUST have their operating system certification before being hired or if they have 6 months after being hired. Both are referenced in materials he receives. Applicants that meet these requirements are moved forward in the interview process.

Applicants that have some coding (our VB course), Security+ and an operating system certification are having their applications forwarded. There are approximately 5 – 10 IT/SA positions available each year. Some years there are short term projects such as the RAM project 4 years ago and there are many positions available.

Other discussions

Other jobs open to our students are Data Processing jobs. For these entry level jobs, they are looking for applicants with basic computer skills and application skills. It appears that a 12 unit certification covering the Core classes may be a good fit for these jobs.

The full degree (as we investigate the Operating Systems requirement) would be a good fit for Systems Administration and IAO/IAM jobs. NOTE: the IAO/IAM language is changing. John will provide the new structure for these jobs (received 4/9/2014 and attached).

It was brought up that right now we offer a programming pathway in our CIS degree. John did not believe that this was necessary if we offer a Computer Science program. Programmers would take that degree program most likely. It was also discussed that they need some entry level database applications jobs. These are jobs in which applicants would be responsible for upkeep and maintenance of databases such as Access. So a program in which students took all of the Microsoft Office courses, Visual Basic for Applications (a new class), Vizio and Adobe Acrobats forms as well as courses such as PHP MySQL and the CIS Database course would be a good fit. This may be a new certification opportunity to support this area with few new classes. This should be examined further.

Credentialled Operating System Training Courses			
TWMS COURSE ID	**COURSE TITLE**	**Category and Level**	
TP70270_ENG	70-270 INSTALLING, CONFIGURING, AND ADMINISTERING MICROSOFT WINDOWS XP PROFESSIONAL	IAT I, II, III	
TP70284_ENG	70-284: IMPLEMENTING AND MANAGING MICROSOFT EXCHANGE SERVER 2003	IAT I, II, III	
TP70290_ENG	70-290: MANAGING AND MAINTAINING A MICROSOFT WINDOWS SERVER 2003 ENVIRONMENT	IAT I, II, III	
TP70291_ENG	70-291: IMPLEMENTING, MANAGING, AND MAINTAINING A MICROSOFT WINDOWS SERVER 2003 NETWORK INFRASTRUCTURE	IAT I, II, III	
TP70294_ENG	70-294: PLANNING, IMPLEMENTING, AND MAINTAINING A MICROSOFT WINDOWS SERVER 2003 ACTIVE DIRECTORY INFRASTRUCTURE	IAT I, II, III	
TWMS-505631	70-640: Configuring Windows Server 2008 Active Directory Training	IAT I, II, III	
TWMS-505629	70-642: Configuring Windows Server 2008 Network Infrastructure Training	IAT I, II, III	
TWMS-505627	70-646: Windows 2008 Server Administrator Training	IAT I, II, III	
TP70647_ENG	70-647: WINDOWS SERVER 2008 ENTERPRISE ADMINISTRATOR	IAT I, II, III	
TWMS-505630	70-662: Configuring Microsoft Exchange Server 2010 Training	IAT I, II, III	
TP70680_ENG	70-680: CONFIGURING WINDOWS 7	IAT I, II, III	
TP70685_ENG	70-685: WINDOWS 7: ENTERPRISE DESKTOP SUPPORT TECHNICIAN	IAT I, II, III	
TWMS-509394	Automated Digital Networking System (ADNS) F CIN A-101-1125/Navy F School Provided	IAT I, II, III	
TWMS-509395	Automated Digital Networking System (ADNS) H CIN A-101-1125/Navy F School Provided	IAT I, II, III	
TWMS-509396	Automated Digital Networking System (ADNS) J CIN A-101-1125/Navy F School Provided	IAT I, II, III	
TWMS-509397	Automated Digital Networking System (ADNS) K CIN A-101-1125/Navy F School Provided	IAT I, II, III	
TWMS-509383	CISCO Certified Entry Network Professional (CCNP): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509382	CISCO Certified Entry Networking Technician (CCENT): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509384	CISCO Certified Network Associate (CCNA): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
J-150-2955	GLOBAL COMMAND AND CONTROL SYSTEM MARITIME SYSTEM ADMINISTRATOR	IAT I, II, III	
A-150-0045	GLOBAL COMMAND AND CONTROL SYSTEM-MARITIME (GCCS-M) 4.X SYSTEM ADMINISTRATOR	IAT I, II, III	
A-150-3400	GLOBAL COMMAND AND CONTROL-MARITIME(GCCS-M) 4.0.3 SYSTEM ADMINISTRATOR	IAT I, II, III	
A-150-3500	GLOBAL COMMAND AND CONTROL-MARITIME(GCCS-M) 4.1 SYSTEM ADMINISTRATOR	IAT I, II, III	
W-150-2130	HOST-BASED SECURITY SYSTEM (HBSS) VERSION 4.5	IAT I, II, III	
TWMS-509389	Integrated Shipboard Networking System (ISNS) Compose 3.0 Increment 1 CIN A-150-1121/Navy F School Provided	IAT I, II, III	
TWMS-509390	Integrated Shipboard Networking System (ISNS) Compose 3.0 Increment 1 CIN A-150-1121/Navy F School Provided	IAT I, II, III	
TWMS-509391	Integrated Shipboard Networking System (ISNS) Compose 3.0 Increment 1 MOD 1 (C) CIN W-150-0101/Navy F School Provided	IAT I, II, III	
TWMS-509392	Integrated Shipboard Networking System (ISNS) Compose 3.5 (D) CIN W-150-0800/Navy F School Provided	IAT I, II, III	
TWMS-509393	Integrated Shipboard Networking System (ISNS) W/Compose 4.0 (D) CIN W-150-0800/Navy F School Provided	IAT I, II, III	
EG_70290	MANAGING AND MAINTAINING A MICROSOFT WINDOWS SERVER 2003 ENVIRONMENT (EXAM 70-290) EXPRESS	IAT I, II, III	
TWMS-509376	Microsoft Training for Exchange Server 2003 Infrastructure: Skillport/Vendor Provided	IAT I, II, III	
TWMS-509377	Microsoft Training for Exchange Server 2007 Infrastructure: Skillport/Vendor Provided	IAT I, II, III	
TWMS-509378	Microsoft Training for Exchange Server 2010 Infrastructure: Skillport/Vendor Provided	IAT I, II, III	
TWMS-509379	Microsoft Training for Server 2003 Active Director: Skillport/Vendor Provided	IAT I, II, III	
TWMS-509373	Microsoft Training for Server 2003 Network Infrastructure: Skillport/Vendor Provided	IAT I, II, III	
TWMS-509380	Microsoft Training for Server 2008 Active Director: Skillport/Vendor Provided	IAT I, II, III	
TWMS-509374	Microsoft Training for Server 2008 Network Infrastructure: Skillport/Vendor Provided	IAT I, II, III	
TWMS-509375	Microsoft Training for Windows 7 Network Infrastructure: Skillport/Vendor Provided	IAT I, II, III	
A-531-0021	NAVY TACTICAL COMMAND SUPPORT SYSTEM (NTCSS) II MANAGER	IAT I, II, III	
TWMS-509398	Red Hat Certified System Administrator (RHCSA): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509403	Red Hat Certified Architect (RHCA): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509402	Red Hat Certified DataCenter Specialist (RHCDS): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509399	Red Hat Certified Engineer (RHCE): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509401	Red Hat Certified Security Specialist (RHCSS): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509400	Red Hat Certified Virtualization Administrator (RHCVA): Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509381	UNIX: Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509386	VM DataCenter Virtualization: Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509387	VM Desktop Virtualization: Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509388	VM VFabric: Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	
TWMS-509385	VMWare Certified Professional Infrastructure: Carnegie-Mellon/Skillport/Vendor Provided	IAT I, II, III	

Risk Management Framework (RMF) Changes in Terms
DIACAP -> RMF

Old Term	New Term
• Certification and Accreditation (C&A)	• Risk Management Framework (RMF)
• Certification	• Assessment or • Security Control Assessment
• Accreditation	• Authorization
• Requirements	• Controls
• Protection Level - PL1/PL2 - PL3 - PL4/PL5	• Accessibility - Baseline - Baseline + Accessibility Overlay - Baseline + CDS Overlay
• Level of Concern	• Impact Level
• Security Requirements Traceability Matrix (SRTM)	• Security *Controls* Traceability Matrix (SCTM)

Risk Management Framework (RMF) Changes in Terms
DIACAP -> RMF

Old Term	New Term
• System Security Authorization Agreement (SSAA) • System Security Plan (SSP)	• System Security Plan (SSP)
• Certification Test and Evaluation (CT&E) • Security Test and Evaluation (ST&E) Report	• Security Assessment Report (SAR)
• Designated Accrediting Authority (DAA)	• Authorizing Official (AO) • Delegated AO (DAO)
• Certifier • Certification Authority • Service Certifying Organization (SCO) Information System Security Professional (ISSP)	• Security Control Assessor (SCA)

Risk Management Framework (RMF) Changes in Terms
DIACAP -> RMF

Old Term	New Term
• Chief Information Assurance Officer (CIAO)	• Chief Information Security Officer (CISO)/ Senior Information Security Officer (SISO)
• No equivalent	• Risk Executive (function) (REf)
• No equivalent	• Common Control Provider (CCP)
• No equivalent	• Overlay (e.g. Accessibility, CDS, Standalone, etc.)
• Information Assurance Manager (IAM)	• Information System Security Manager (ISSM)
• Information Assurance Officer (IAO)	• Information System Security Officer (ISSO)

Risk Management Framework (RMF) Changes in Terms
DIACAP -> RMF

Old Term	New Term
• Program Manager	• Information System Owner (ISO)
• Information System Security Engineer (ISSE)	• ISSE • Information Assurance Systems Architect and Engineer (IASAE)
• Master SSP (MSSP)	• Information Assurance Standard Operating Procedures (IA SOP)
• Guest System	• External Information System
• Interim Approval to Operate (IATO)	• Authorization to Operate (ATO) with a Plan of Actions and Milestones (POA&M)

Computer Information Systems Advisory Committee Meeting

Minutes

November 20, 2014

Members Present:

Name	Title	Company
Chris Harper	IT Infrastructure Manager	AltaOne
Tim Dawson	CEO	Approach Robotics
Kara Tolbert	Continuing Education Manger	Cerro Coso Community College
Valerie Karnes	Professor, CIS	Cerro Coso Community College
Frank Timpone	Professor, Business	Cerro Coso Community College
Karen O'Connor	Professor, BOT/Department Faculty Chair	Cerro Coso Community College
Lori Acton	Council Member	City of Ridgecrest
Melissa Olivarez	Operations Coordinator	Continental Labor
Daniel Johnson	Network & Controls Supervisor	Coso Operating Company
Sean Callahn	IT Director	Jacobs
Rich Christensen	Recruiter	Jacobs
Eileen Shibley	CEO	Monarch
Margaret Porter	Information Specialist	NAVAIR
Scott Fairfield	IT Specialist	NAVAIR
Linda Homer	Computer Scientist	NAVAIR
Kishor Joshi	Manager	Pertexa
Katherine Hu	Sr. Chemist/Environmental Lab Director	Searles Valley Mineral

The meeting was called to order by Valerie Karnes and the members present introduced themselves, who they worked for and their role in the organization. Several members were absent due to travel and/or work schedules. Minutes will be sent out following the meeting.

Minutes of the April 2014 meeting were reviewed and approved.

The committee purpose agenda was reviewed and employers raised the topic of internships/work experience and job shadowing as a need for most of the organizations. Discussion regarding our work experience courses, potential barriers to student completion and issues with security clearances for those working for the base. Advantages and benefits for students and employers in offering internships and work experience were also discussed. Students would benefit from real world experiences, which would enhance their education that could be noted on a resume. In addition, internships/work experiences could result in aiding in completion and job placement. Several attendees noted that they had internships while in school and that they not only enhanced their educational background, but also resulted in placements.

As Cerro Coso Community College work experience courses are not currently being offered, at this point there is no avenue for credit to be offered to students. A suggestion of offering a Work Experience certificate (new certificate) was brought forward as this would not change the current programs at the college, but will offer students a supplemental certificate that would be valued by employers. Valerie will check with the Counseling department and the CTE Dean to inquire about bringing these courses back and in the form of a certificate.

The Committee moved next to the Computer Information Systems program certificates that were brought forward for review.

The Data Analyst Certificate (12 units) certificate proposed the following courses below:

- ✓ BSAD 220 Principles of Project Management (3 units)
- ✓ BSAD 220 Problem Solving, Decision Making, and Computer Applications in Business (3 units)
- ✓ CSCI 251 Introduction to Visual Basic Programming (3 units)
- ✓ CSCI 270 Introduction to Database Design and Management (3 units)

The purpose of this certificate is to prepare students for positions in data collection, processing, and analysis and to provide a foundation for future training in big data analysis. The certificate would be offered online and includes four courses and could be completed in one year. The committee reviewed the certificate and approved it. The only suggestion was to have a SQL course. They indicated that there is a need and they would hire these students. One person from China Lake said that it would fit in the Configuration Management/ Data Management group at the base. They said they need an understanding of SQL but not Microsoft specific. They also said that the SQL could be in another course. Valerie will check with Matt Hightower about the content of CSCI C270 (Introduction to Database Design and Management) and inquire if SQL is included in the topics and assignments in this course.

The Information Technology Certificate (13 units) was reviewed next as a basic Information Technology certificate that would serve organizations hiring for various positions as noted in the purpose below. The courses identified for this certificate are:

- ✓ CSCI C101: Introduction to Computer Information Systems (3 units)
- ✓ CSCI C140/141 A+ Essentials (4 units)
- ✓ CSCI C143: Network + and Fundamentals of Networking (3 units)
- ✓ CSCI C146: Security + Fundamentals (3 units)

The purpose of this certificate is to prepare students for entry-level positions in computer repair, networking, cyber security and general information systems jobs. The certificate would be offered online and includes four courses (13 units) and can be completed in one year. The committee endorsed

this certificate and said they would hire students with this type of certificate. It was noted that it would be good for students retraining with a desire to go into another field (IT). This proposed certificate would fit the need for students entering the Information Assurance positions (cyber security), basic help desk, entry-level network positions and general computer technicians. NAVAIR requires Security + certification prior to hiring, so this certificate fits their needs. Coso Operating company is currently hiring and A+ is a requirement and the addition of Security + would be a good thing to have for incoming employees. Sean Callahan (Jacobs) said the certificate is "perfect' for what they need at Jacobs.

Discussion regarding the value of hands-on laboratories was discussed and the committee expressed that additional hands-on laboratories would be valuable to the students and the employers. It was suggested that we have students note the hands-on laboratories in their resumes so employers would know that they did labs physically and not virtually. We discussed the optional tutoring sessions that had been proposed through the Annual Unit Plan process as well as the updating of curriculum that Valerie Karnes, Matt Hightower and Chris Harper will be doing in the spring term. They were fully supportive of this as an option.

After the review of the certificate, the committee reviewed the CIS Model Curriculum and the committee supported the degree pathway as well. Questions arose about the need for an Operating Systems certification. Currently NAVAIR uses SkillPort/SkillSoft which is self paced program for incoming employees. They didn't feel that we needed to add this to either the certificate or the degree program.

The Certification Testing Center at the college was brought up as a service for employers. They stated that this was a crucial service to the employers, students and community. They stated that the college needs to advertise this center more broadly so that potential candidates locally would know that they are able to take their exams on Friday at the college. Perhaps some advertising would be helpful.

Throughout the conversations regarding the CIS certificates and programs, employers noted that the ability of students to be computer literate and have MS Office experience was a basic skill that is required for any employment. Karen shared the Business Office Technology teaches these components and employers stated that the skills are an important basic skill that will lead to employment. Without these basic computer skills and MS Office knowledge, students would not be employable.

The question of CEU requirements for employees to keep their certifications current was raised. There is a need for those holding certifications to take 17 CEU a year (50 units over a three year program). Kara Tolbert from the Office of Continuing Education at the college brought up that the college could offer supplemental not for credit training to meet the needs of employers. She also talked about meeting the needs for customized training. Jacobs Technology and others will meet with Kara separately to discuss specific needs of the employers. Kara also talked about rolling out seminars and

other types of trainings to industry in the valley. There was a lot of interest in these types of professional services to the valley. Many of the employers were not aware that the college had this type of service and/or ability to provide customized education not for credit. Advertisement of these services and offering to the community needs to be expanded.

Karen O'Connor provided an update about the Computer Science AS-T and the challenge with the additional three units that caused the program to be rejected by the state. Employers asked if we can have multiple classes with various units or if there was another "creative" method we can use. Karen stated that we are working with the Science and Math departments to come up with a solution. She inquired about the need for this computer science transfer program and the employers unanimously supported the need for this program in our valley to support the mission of the Naval Air Warfare Center at China Lake, local contractors, new companies bringing up manufacturing and high technological businesses in Ridgecrest. Other businesses in the valley will also need those with computer science skill levels as technology continues to increase. Employers will be submitting letters of support for the continuation of the pursuit of an AS-T in Computer Science so the college can provide evidence to the State of California of the need for this transfer program and their support.

Other needs employers presented included the need for students competent in manufacturing processes including fiberglass, cybernetics, AutoCad, ProEngineering and SolidWorks software packages. Additional needs include students having a combination of computer skills and medical background (Medical Terminology and Physiology) , Chemistry background for laboratory positions at Searles Valley Minerals. Linux (Red Hat Enterprise edition) operating system is an emerging need that needs to be incorporated into our classes in CIS.

The next meeting date will be either in late spring or in the fall depending on the needs of industry and the progression of the new curriculum in the spring term.

ACTION ITEMS

- ✓ Valerie Karnes will check with the Counseling department and the CTE Dean to inquire about bringing Work Experiences courses back and explore the possibility of creating an additional certificate that would provide value to the students and employers. It would not impact current programs.
- ✓ Valerie Karnes will check with Matt Hightower about the content of CSCI C270 (Introduction to Database Design and Management) and inquire if SQL is included in the topics and assignments in this course.
- ✓ Valerie Karnes will complete the Advisory Minutes and send out on Monday, November 24, 2014 for review.
- ✓ Kara Tolbert will meet with Sean Callahan to follow up on the CEU needs for Jacobs's employees.

- ✓ Kara Tolbert will contact other employers about their needs for continuing education and community services for employers
- ✓ Employers will send letters of support for the Associate of Science degree for Transfer (AS-T) in Computer Science to Valerie Karnes and Karen O'Connor.

CIS Advisory Committee Members
2015-16

First Name	Last Name	Company Name	Program	Email	Phone
Harper	Christopher	AltaOne	CIS	chharper@cerrocoso.edu	
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Scott	Lougheed	Saalex	LSRS Program Manager	scott.lougheed@saalex.com	760-384-4209

ESCC Area
Business and Information Technology
Advisory Committee Meeting
Spring 2014 (May 1, 2014)
Minutes

Attendees: Suzie Ama, Deanna Campbell, Julie Faber, Joanie Hanson, Matt Hightower, Gina Jones

1. **Introductions**

2. **Information and Communication Technology Model Curriculum**

   The group reviewed the proposed Information and Communication Technology model curriculum from the state. There was discussion about not having to implement it and having some flexibility in courses if we did. Comments in favor included cutting down the number of electives in the program and that the Java and PHP are specialty courses that, in practice, when the skills are needed in this area, are contracted out. There was also discussion regarding problem solving training. It was agreed that the program looked good, that there is a place for it, and that it provides a good foundation for on-the-job training.

3. **Web Professional Program**

   Suzie presented the Web Professional program certification mapping for Jacobs training needs. Julie expressed the applied need to have more open-source CMS training (specifically WordPress) and that integrating social networking into the training would serve the program well. Suzie discussed the courses that provide some of that training. Julie also suggested that students obtain more depth in PHP training than they are currently obtaining from DMA C213. There was discussion about the rapid changes to the profession and the lack of need for a bachelor's degree to be employable in the local communities.

4. **SAM 2013**

   There was discussion about the use of SAM in the applications courses. It was agreed to defer this to Karen and the BSOT program.

5. **Business Leaders Observations and Recommendations**

   These were incorporated into the above discussions.

6. **Adjournment**

The meeting adjourned at 2:00PM.

ESCC Area
Business and Information Technology
Advisory Committee Meeting
Spring 2015 (April 30, 2015)
via Video Conference, 1:00 – 1:55
Minutes

Attendees: Deanna Campbell (Bishop), Chris Carmichael (Mammoth), Julie Faber (Bishop), Gina Jones (Bishop), Matt Hightower (Bishop), Karen O'Connor (IWV)

1. **Introductions & Updates**
   The group welcomed the addition of Chris Carmichael (of Carmichael Business Technologies) to the committee. Chris described his business and the services that they offer locally and internationally.

2. **Personnel Changes**

   Matt described Valerie Karnes' transition from Dean of CTE to faculty and the hiring of Mike McNair to fill the Dean's position.

3. **Program Changes & Updates**

   - **This Year**
     - **Computer Science Deactivation**
       Matt and Karen described the need to place the Computer Science program into a "deactivated" state due to the AS-T program's non-approval by the State. The non-approval was based on too many units in the program, which was attributed to higher than average units in the required Math and Physics courses. Karen pointed out that many schools in the state are in the same situation and that she has been asked to add the courses in the program to the schedule for those students that are currently in program.

     - **Data Analyst I Certificate of Achievement**
       The Data Analyst I program was approved by CIC this year. It will go to the Regional Consortium and then, if approved there, to the State for approval. The purpose of the program is prepare students for entry-level positions in the Data Analysis, Data Science, Big Data fields. Comments from the committee described the program as "perfect for remote workers in the ESCC" and added that it would be good for employees of government agencies and hospitals within the ESCC area and many other employers in the South County.

- **Web Fundamentals Certificate of Achievement**
  The committee reviewed the Web Fundamentals Certificate of Achievement that was due for its second reading at CIC the following day (since approved). Due to other commitments, Suzie Ama could not attend the meeting but provided this description of the program for the committee.

  > The active Web Professional A.S and Certificate provide students with advanced and varied skills in web design and development. However, it is a high unit program, and we have identified a need for a mid-way academic milestone that effectively provides students with entry level skills in web design and development. More specifically, the Web Fundamentals Certificate will qualify students for jobs that entail maintenance and update of web sites (both static HTML and content management systems). They will be able to develop new web sites, and install and configure content management systems. And they will be able to create custom graphics and graphic user interfaces for the creation of new sites or the redesign of existing sites. Students will also have acquired experience working in teams and learned to communicate effectively with others.

  Members of the committee were in favor of the certificate. There were some questions and suggestions for the future. There was a question about the use of Dreamweaver and the lack of identifiable specific topics in mobile applications and popular content management systems (CMS). It was suggested that one of Dreamweaver's purpose was that it was being used as an HTML debugging tool and that mobile applications and CMS use were integrated throughout the program.

- **Next Year**

  - **CIS AS Degree and Certificate of Achievement**

    As discussed at the last (5/1/14) ESCC Business and Information Technology Advisory Committee meeting, the CIS AS degree and Certificate of Achievement are being redesigned to follow the State's Model Curriculum. The redesign is in the queue for CIC for the beginning of next year.

  - **Information Technology Plus Certificate of Achievement**

As part of the redesign of the CIS program, a new certificate is being developed. This certificate will have CIS 101, 142, 143, and 146 as the required courses. The committee was very enthusiastic about this certificate and viewed it being useful for employers in the service area. The outcome skills were identified as being essential and very "hireable" and the ability to have it offered online was viewed as a tremendous asset.

4. **Student Club – Millionaires in the Making**

   Frank Timpone created a student club for Business students at the IWV campus. The club currently has 15 students, has officers, and is meeting for the second time this semester to finalize the creation process. The club's name is "Millionaires in the Making". The committee was enthusiastic about this as well and looks forward to hear more about it as it grows.

5. **Adjournment**

   The meeting adjourned at 1:53PM.

Department of Business and Information Technology Advisory Committee: Fall 2014

Organization	Name	Contact Information
Bishop Chamber of Commerce Representative	Julie Faber Owner, Mountain Studio	760-872-1045 julie@mtnstudio.com
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Mammoth Lakes Chamber of Commerce Representative	Billy Gogesch Consultant Pupfish Design	650-257-0910 billyg@pupfishdesign.com
Mono County Superintendent of Schools Representative	Joe Griego Director, Information Technology	760-934-0031 jgriego@monocoe.org
Owens Valley Career Development Center Representative	Gina Jones Director	gjones@ovcdc.com 760-873-5107 2574 Diaz Lane Bishop, CA 93514 760-873-5107
Mammoth Mountain Ski Area Representative	Randy Broderick Director, Information Systems	760-934 -0688 rbroderick@mammoth-mtn.com
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Mammoth Lakes Representative at Large	Vickie Taton	vtaton@cerrocoso.edu
ESCC Representative	Deanna Campbell	dcampbel@cerrocoso.edu Director, ESCC 760-872-1565
Cerro Coso Community College, Ridgecrest	Karen O'Connor, Professor Faculty Chair	koconnor@cerrocoso.edu 760-384-6172
Cerro Coso Community College, Bishop	Matt Hightower, Professor	Bishop: 760-873-5312 Mammoth 760-924-1600
Cerro Coso Community College, Ridgecrest	April Browne, Instructor	april.browne@cerrocoso.edu 760-384-6171
Cerro Coso Community College, Ridgecrest	Frank Timpone, Assistant Professor	frank.timpone@cerrocoso.edu 760-384-6149
Cerro Coso Community College	Valerie Karnes, Dean Career Technical Education	vkarnes@cerrocoso.edu

Computer Information Systems Advisory Committee Meeting
Minutes
November 19, 2015

Members Present:

Name	Title	Company
Gerald Baker	NAWC, JT3 Department Manager	NAWC
Megan Callahan	Student	Cerro Coso Community College
Sean Callahan	IT Director	Jacobs
Mark Henderson	R&D Material Branch Head	NAWCWD
Linda Homer	Computer Scientist	NAVAIR
Valerie Karnes	Professor, CIS	Cerro Coso Community College
Amy Kennedy	Counseling Department	Cerro Coso Community College
Scott Lougheed	Program Manager	Saalex
Ashlin Mattos	Job Development Specialist	Cerro Coso Community College
Paul McKenzie	IA, System Administrator	Saalex
Karen O'Connor	Professor, BOT/Department Faculty Chair	Cerro Coso Community College
Melissa Olivarez	Operations Coordinator	Continental Labor
John Paul	Director	NDTI
Uwe Schmiedel	Director of Engineering	Monarch
Kara Tolbert	Continuing Education Manger	Cerro Coso Community College
Angel Zamarron	Pathways Program Coordinator	NAWC

Introductions

Valerie Karnes called the meeting to order and the members present introduced themselves, who they worked for and their role in the organization. Several members were absent due to travel and/or work schedules. Minutes will be sent out following the meeting.

A certificate of Appreciation was awarded to Sean Callahan of Jacobs who has served faithfully on the committee and has been instrumental in getting the first internship program started. He is moving to another job in January and will be a missed member of the Advisory Committee.

Minutes of the November 2015 meeting were reviewed and approved with no changes.

Committee Purpose and Overview

The purpose of the committee purpose and overview were reviewed. Employer advise and guidance to our programs is a critical component to the success of our programs.

Computer Information Systems/Business Information Worker Programs

The new Computer Information Systems program revised form the last meeting a year ago was reviewed and the committee was notified that the program work has been done and gone through the local college process and will be presented to the Kern Community College District Board of Directors in December. From there, it will go to the California Community College Chancellor's Office for state approval. We hope that March or April will approve the program in order to promote the program prior to registration for the summer and fall terms.

Karen O'Connor presented the new statewide program for Business Information Worker (BIW) and shared the components of our current Office Technology program.

The group discussed the value of hand-on training in the CIS program and/or a fully online program would be adequate. For the NAWC IT Apprenticeship program, Angel expressed the online program fits the needs of their workers, as they are required to work full time during the day. John Paul stated that the online flexibility was good for their workforce. After lengthy discussion, there was consensus in the value of hands-on experiences for the workforce and the hybrid model of having theory taught online with several required weekend (Flex Friday/Saturday) on campus would fit the needs of the employers and employees. Further discussion and needs for the volume of employees that would be needed in this area in the future suggests that one online section and perhaps on hybrid section would be needed to fill the online community and the IWV employers. Valerie will talk to administration about the possibility of running one hybrid section of CSCI C142, CSCI C143 and CSCI C146 in the course of a year to test the success of that model. The employers indicated that they would have the following needs for students in this pathway per year (Jacobs 30-40 employees per year, NAWC Apprenticeship Program 40-50 per year, Saalex 15 in the next six months with a 15% replacement rate each year, Continental Labor 6-10 per year and Monarch 1 per year). Other employers had to leave the meeting early or were not able to attend due to other commitments. Valerie will email and request their needs for annual employees. With over 100 potential placements per year, the college needs to expand the offerings to meet the employment needs in the Indian Wells Valley. From conversations at the meeting, this need is expected to increase each year. Employers are scrambling to hire in this area and sometimes end up hiring each other's employees to meet the needs. This is not a preferred method and they would like to have a pool to select future employees.

Karen O'Connor outlined the needs of college as far as any expansion to the course offerings and explained that if we offer the program on the campus, we need to know that there are sufficient students that would enroll. She asked about the best way for us to get the information to the employers and they indicated an email blast would be best.

Employers were asked if they would support the weekend labs and contribute to scenarios to prepare students to enter the job market. They would support and assist in the labs. The new Computer Information Systems Student Club will be meeting tomorrow to form and the labs could provide our current students with these experiences until a hybrid class could be offered. This will require a space at the college and equipment for both the student club and the future of an expanded program. Sean Callahan will send a configuration of what is needed to set up a network for these types of experiences.

Internships/Apprenticeship Programs

Sean Callahan outlines for the group the intermittent student employment program that he has championed at Jacobs. This employment program interviews top students in the CSCI C101 class that are on track to major in CIS and provides intermittent training and employment during the student college experience. During the time that they are not in class, they would go through a training program at Jacobs in Information Assurance, apply for a security clearance and be mentored for six months. As they complete their Security Plus class and certification, the students would be eligible for full time hire depending upon their performance as an intern.

Angel outlined the new NAWC Information Technology Apprenticeship program where students would work full time and take up to six units to continue their education. As the program is still in development, some of the details are yet to be worked out.

Other employers may be interested in developing similar internship/apprenticeship program and will work with Valerie and Ashlin.

Customized Training

Kara Tolbert outlined the customized training and reviewed with the committee the options that are available to them including non-credit professional development training, ETP funding and options for training. Kara offered to meet with them to outline the specific options for their organization. One offering that was discussed was the IT boot camps (A+, Net+ and Security+). The need for the PearsonVue training Center is also an important component that is needed by the base and the employers. Cerro Coso Community College lost its proctor due to an employee sudden death.

Industry needs - Cyber Security Certificate/Degree

The final discussion was about the new Cyber Security courses that are now being offered through C-ID at the college and the question about if the college needs a higher-level program than the Information Technology Plus certificate and Computer Information Systems degree. Do we need both programs?

The group reviewed the components and agreed that Cerro Coso Community College needs to develop not only a certificate, but a new Cyber Security Associate of Science degree and keep the Computer

Information Systems degree program as well. The programs would have the same first 4 classes (CSCI C101, 142, 143 and 146), but then would spin off into different directions.

The Computer Information Systems degree would serve the needs of computer operators, computer repair, computer networking and entry level to information assurance. It is important to keep this program, as it would fit the needs for IT professionals with a need for some security. There are also needs of Cyber Security that need a some IT content.

The Cyber Security program would serve the higher-level functions including cyber hacking, information security, computer forensics, and network defense. The Cyber Security program would meet the needs of their incumbent workforce for continual education. Employers stated that if a student completes a degree, they will be promoted and have an increase in salary. In the CIS and Cyber Security fields, continual education is crucial and employment is expected to continue to grow and expand. Paul will send Valerie the latest information on what would be required for the higher level program components and she will research the classes that will need to be developed and present it to the administration at the college. There will also be a need for dedicated classroom and additional faculty with expertise in these areas.

The meeting was adjourned at 1:10 pm.

Occupation Overview

EMSI Q2 2015 Data Set

Information Technology/Computer Information Systems

JULY 2015

3000 College of Heights
Blvd Ridgecrest, California
93555
760.384.6258

Parameters

Occupations

Code	Description
11-3021	Computer and Information Systems Managers
15-1122	Information Security Analysts
43-9011	Computer Operators
49-2011	Computer, Automated Teller, and Office Machine Repairers

Regions

38 items selected. See Appendix A for details.

Timeframe

2015 - 2020

Datarun

2015.2 – QCEW Employees

4 Occupations in 38 ZIPs

Occupation Summary for 4 Occupations

95	5.5%	$45.25/hr
Jobs (2015)	**% Change (2015-2020)**	**Median Hourly Earnings**
44% below National average	Nation: 6.7%	Nation: $46.27/hr

Growth

95	100	5	5.5%
2015 Jobs	**2020 Jobs**	**Change (2015-2020)**	**% Change (2015-2020)**

Occupation	2015 Jobs	2020 Jobs	Change	% Change

Computer and Information Systems Managers (11-3021)	57	60	3	5%
Information Security Analysts (15-1122)	13	15	2	15%
Computer Operators (43-9011)	6	6	0	0%
Computer, Automated Teller, and Office Machine Repairers (49-2011)	19	20	1	5%

Percentile Earnings

$35.82/hr	$45.25/hr	$57.42/hr
25th Percentile Earnings	**Median Earnings**	**75th Percentile Earnings**

Occupation	25th Percentile Earnings	Median Earnings	75th Percentile Earnings
Computer and Information Systems Managers (11-3021)	$45.53	$57.21	$71.99
Information Security Analysts (15-1122)	$32.76	$42.68	$58.12
Computer Operators (43-9011)	$16.93	$21.54	$24.07
Computer, Automated Teller, and Office Machine Repairers (49-2011)	$14.25	$18.03	$23.25

Regional Trends

	Region	2015 Jobs	2020 Jobs	% Change
●	Region	95	100	5.3%
●	State	79,746	85,489	7.2%
●	Nation	595,760	635,895	6.7%

Regional Breakdown

* Highlighted areas show counties that contain the selected zip codes

ZIP	2020 Jobs
Ridgecrest, CA 93555 (in Kern county)	33
Edwards, CA 93524 (in Kern county)	22
Edwards, CA 93523 (in Kern county)	11
Tehachapi, CA 93561 (in Kern county)	<10
Bishop, CA 93514 (in Inyo county)	<10

Occupational Programs

4	16	2
Programs (2013)	Completions (2013)	Openings (2013)

CIP Code	Program	Completions (2013)
11.0103	Information Technology	10
11.0801	Web Page, Digital/Multimedia and Information Resources Design	5
11.0701	Computer Science	1
11.0101	Computer and Information Sciences, General	0

Industries Employing 4 Occupations

Industry	Occupation Group Jobs in Industry (2015)	% of Occupation Group in Industry (2015)	% of Total Jobs in Industry (2015)
Custom Computer Programming Services	13	13.4%	4.6%
Other Computer Related Services	11	11.5%	4.6%
Computer Systems Design Services	11	11.3%	4.6%
Federal Government, Civilian, Excluding Postal Service	10	10.6%	0.2%
Electronics Stores	<10	4.6%	6.0%

Appendix A - Regions

Code	Description
92328	Death Valley, CA (in Inyo county)
92389	Tecopa, CA (in Inyo county)
93238	Kernville, CA (in Kern county)
93240	Lake Isabella, CA (in Kern county)
93255	Onyx, CA (in Kern county)
93283	Weldon, CA (in Kern county)
93285	Wofford Heights, CA (in Kern county)
93512	Benton, CA (in Mono county)
93513	Big Pine, CA (in Inyo county)
93514	Bishop, CA (in Inyo county)

93515	Bishop, CA (in Inyo county)
93516	Boron, CA (in Kern county)
93517	Bridgeport, CA (in Mono county)
93519	Cantil, CA (in Kern county)
93523	Edwards, CA (in Kern county)
93524	Edwards, CA (in Kern county)
93526	Independence, CA (in Inyo county)
93527	Inyokern, CA (in Kern county)
93528	Johannesburg, CA (in Kern county)
93529	June Lake, CA (in Mono county)
93530	Keeler, CA (in Inyo county)
93531	Keene, CA (in Kern county)
93541	Lee Vining, CA (in Mono county)
93542	Little Lake, CA (in Inyo county)
93545	Lone Pine, CA (in Inyo county)
93546	Mammoth Lakes, CA (in Mono county)
93549	Olancha, CA (in Inyo county)
93554	Randsburg, CA (in Kern county)
93555	Ridgecrest, CA (in Kern county)
93556	Ridgecrest, CA (in Kern county)
93560	Rosamond, CA (in Kern county)
93561	Tehachapi, CA (in Kern county)
93562	Trona, CA (in San Bernardino county)
93581	Tehachapi, CA (in Kern county)
93592	Trona, CA (in San Bernardino county)
93596	Boron, CA (in Kern county)
96107	Coleville, CA (in Mono county)
96133	Topaz, CA (in Mono county)

Appendix B - Data Sources and Calculations

Occupation Data

EMSI occupation employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry.

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Completers Data

The completers data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Staffing Patterns Data

The staffing pattern data in this report are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

Industry Data

EMSI industry data have various sources depending on the class of worker. (1) For QCEW Employees, EMSI primarily uses the QCEW (Quarterly Census of Employment and Wages), with supplemental estimates from County Business Patterns and Current Employment Statistics. (2) Non-QCEW employees data are based on a number of sources including QCEW, Current Employment Statistics, County Business Patterns, BEA State and Local Personal Income reports, the National Industry-Occupation Employment Matrix (NIOEM), the American Community Survey, and Railroad Retirement Board statistics. (3) Self-Employed and Extended Proprietor classes of worker data are primarily based on the American Community Survey, Nonemployer Statistics, and BEA State and Local Personal Income Reports. Projections for QCEW and Non-QCEW Employees are informed by NIOEM and long-term industry projections published by individual states.

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department